

REMARKS/ARGUMENTS

The Applicants have carefully considered this application in connection with the Examiner's Action mailed January 21, 2005, and respectfully request reconsideration of this application in view of the following remarks. The Applicants originally submitted Claims 1-20 in the application. No amendments are offered in this response. Accordingly, Claims 1-20 are currently pending in the application.

I. Formal Matters and Objections

The Applicants note that this response is being filed after the statutory deadline of July 21, 2005, due to an unintentional delay. A petition pursuant to 37 C.F.R. § 1.137(b) is submitted herewith with the appropriate fees to revive the application.

The Applicants further note that when the Application was filed, a duplicate sheet 9, containing Claims 15-20, was submitted, and that these claims are duplicated in the published U.S. Patent Application No. 2005/0168364 A1, corresponding to this application. The Applicants regret the error, and ask that the Examiner kindly disregard the duplicate claims in prosecution. The Applicants disregard these duplicated claims in this response.

The Examiner has objected to the drawings as being informal. The Applicants submit amended formal drawings herewith under 37 C.F.R. § 1.121, and respectfully request that the Examiner withdraw the objection to the drawings.

II. Rejection of Claims 1-8, 12 under 35 U.S.C. § 103(a)

The Examiner has rejected Claims 1-8 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Yacoubian, *et al.*, IEEE Photonics Technology Letters, Vol. 15, No. 1, Jan. 2003 (Yacoubian)

over U.S. Patent No. 4,288,785 to Papuchon, *et al.*, and U.S. Patent No. 5,039,988 to Hong. The Applicants respectfully traverse the Examiner's rejection, because the combination of Yacoubian, Papuchon and Hong does not teach or suggest each and every element of the presently claimed invention. Specifically, with respect to independent Claim 1, the combination cited in the Office Action fails to teach or suggest controlling the phase shift of a plurality of optical beams.

While Claim 1 recites "supplying bits of a digital data sequence to said plurality of optical phase shifters for controlling the phase shift of the optical beams supplied to the individual ones of said plurality of phase shifters," the portions of Yacoubian cited in the office action do not teach such an element. In particular, the cited portions teach employing MZMs as light switches, wherein the output intensity of each optical channel is switched between the full intensity of that channel and substantially zero, rather than employing MZMs as "phase shifters." Furthermore, switching an optical signal on and off is not equivalent to "controlling the phase shift of the optical beams," because one skilled in the art understands that when a signal is absent, phase is indeterminate.

Furthermore, while Claim 1 recites "splitting the received optical signal into a plurality of mutually coherent optical beams" the portions of Yacoubian cited in the office action do not teach such an element. In particular, the cited portions teach splitting a CW or pulsed laser input using a weighted 1xN coupler, and providing an optical path therefrom to a plurality of MZMs. But this does not teach "mutual coherence" of the optical beams in those optical paths. Furthermore, splitting a CW or pulsed laser input using a weighted 1xN coupler, and providing an optical path therefrom to a plurality of MZMs is not equivalent to "splitting the received optical signal into a plurality of mutually coherent optical beams," because one skilled in the art recognizes that mutual coherence of

optical beams output by the splitter and guided to the plurality of MZMs is not an inherent property of such optical beams.

Furthermore, Papuchon fails to cure the deficiency of Yacoubian. Papuchon teaches the use of a single MZM to induce a phase shift on a single optical beam. Such a use of an MZM is irrelevant. To establish a *prima facie* case of obviousness, there must be a prior art suggestion or motivation to combine the references. Nevertheless, the Examiner does not cite any suggestion within Yacoubian or Papuchon to combine the teachings of these references. In the absence of a citation of some such prior art suggestion, the Examiner has not provided a *prima facie* case of obviousness.

Moreover, modification of Yacoubian to operate using the principle taught by Papuchon would render Yacoubian's invention unsuitable for its intended purpose. Yacoubian relies on a characteristic of some MZMs wherein substantially no light is transmitted through a channel when the MZM is in the off state. As recited previously, this is shown in Figure 1, in which channels are shown to switch between zero and the full intensity value of that channel. Those skilled in the optical arts will immediately recognize that if such an MZM were modified to produce a phase shift to an optical channel rather than to turn off that channel, then the contribution of that channel to the analog output would be nonzero when the phase was shifted. In Yacoubian's D/A converter, this would result in extraneous energy in a bit channel that would degrade the fidelity of the analog output.

For at least these reasons, the combination of Yacoubian and Papuchon fails to sustain a *prima facie* case of obviousness under 35 U.S.C. § 103(a). Hong, which the Examiner cites only for the teaching of a high-speed memory to drive the D/A converter, fails to cure the deficiency of

Yacoubian and Papuchon. Accordingly, the Applicants respectfully request that the Examiner withdraw the rejection of Claims 1-8 and 12 under 35 U.S.C §103(a) and allow issuance thereof.


III. Conclusion

In view of the foregoing amendments and remarks, the Applicants now see all of the claims currently pending in this application to be in condition for allowance and therefore earnestly solicits a Notice of Allowance for Claims 1-20.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

HITT GAINES, P.C.

A handwritten signature in black ink, appearing to read 'DH' with a stylized flourish.

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